DOCUMENT RESUME

ED 218 703 EA 014 626

AUTHOR Wells, Malcolm; Bitter, Gary
TITLE The First Step in Utilizing Computers in Education: Preparing Computer Literate Teachers.
PUB DATE Apr 82
NOTE 13p.; For a related document, see EA 014 627.

EDRS PRICE MF01/PC01 Plus Postage.
DESCRIPTORS Adoption (Ideas); Change Strategies; *Computer Assisted Instruction; Computer Programs; Educational Change; Elementary Secondary Education; Higher Education; *Inservice Teacher Education; Media Selection; *Microcomputers; Program Implementation; Teacher Attitudes; Workshops
IDENTIFIERS Arizona

ABSTRACT

As a result of a survey concerning computer assisted instruction in Arizona schools, Arizona State University developed a program to assist districts in computer instructional program development. In the initial planning phase of the program, a list was drawn up of preparatory functions essential for districts making a transition to computer assisted instruction. This list included inservice programs, curricular modifications, and selection of courseware and hardware. The program was funded for 1981-82. Phase I provided orientation for administrators. Phase II was a 4-week summer institute to train 30 Arizona teachers as resource people able to introduce their districts to computer assisted instruction. The institute covered 10 topics, including: computer systems and logic; introduction to programming techniques; introduction to computer languages; authoring techniques; software selection and review; hardware selection; preparation for computer assisted instruction; computer literacy; and preparation of an inservice program on computer assisted instruction. Ten teams prepared inservice programs such as the one briefly summarized in this report. The summer institutes were evaluated by an attitudinal survey indicating that most participants had positive attitudes toward computers and instruction by peers but experienced frustration when attempting programming. Future recommendations were for more time to be spent on user skills and less on programming and authoring. The program was enthusiastically received. (Author/JM)

****
* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *
****

ED218703

U.S. DEPARTMENT OF EDUCATION
NATIONAL INSTITUTE OF EDUCATION
EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)

X This document has been reproduced as received from the person or organization originating it.

☐ Minor changes have been made to improve reproduction quality.

• Points of view or opinions stated in this document do not necessarily represent official NIE position or policy.

"PERMISSION TO REPRODUCE THIS MATERIAL HAS BEEN GRANTED BY

Gary Bitter

TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)."

THE FIRST STEP IN UTILIZING COMPUTERS IN EDUCATION: PREPARING COMPUTER LITERATE TEACHERS

Malcolm Wells

Gary Bitter

N.S.F. Project Co-directors

Arizona State University

Tempe, Arizona 85287

EA 014 626

The First Step in Utilizing Computers in Education:

Preparing Computer Literate Teachers.

In May 1980, the Working Committee on Microcomputers in Education at Arizona State University, initiated a survey of Arizona Public School Practices and Needs for Computer Assisted Instruction. A survey questionnaire was sent to each school district in Arizona requesting information concerning six computer related issues.[1]

Upon evaluation of these questionnaires, it was found that there was very little use of microcomputers except for courses in computer programming and basic skills in arithmetic. The respondents indicated that approximately one third of the districts used microcomputers to some extent in instructional applications but that 45% of all microcomputers used in the state were being utilized by one district. One conclusion of the committee was that most districts were introducing computers as pilot programs but finding full utilization of this new technology very difficult to attain.

The problems most frequently articulated by the questionnaire respondents were:

1. An acute shortage of personnel who were well trained in the use and implementation of this new technology.
2. A need for assistance in planning computer systems and developing instructional programs.
3. Identification of and access to effective software.

Among the recommendations presented by the committee were two which could be effectively addressed by way of an academic response. The first of these recommendations was to develop courses dealing with the educational use and implementation of microcomputers. The other recommendation of interest was a recommendation to provide a summer workshop and academic year seminars to assist districts in computer instructional program development.

Our goal for this project was to provide training options and support functions to meet the needs of the school districts for the implementation of educational microcomputer technology.

The successful assimilation of educational computer technology and techniques requires a significant modification of the presently existing educational delivery system. In view of the significant commitment of capital and staff resources necessary to effectively implement programs of this magnitude, it is essential that the district administration and governing board enthusiastically embrace and support the total concept of computer supported education.

In our initial planning phase, we recognized that adequate planning and preparation was imperative to a smooth and effective transition to computer supported education. We considered the following preparatory functions to be essential prerequisites to an orderly transition to this new educational technology.

1. In order to maximize the opportunity for faculty participation in the initial planning process, an in-service, computer awareness program should be conducted for ALL teachers as early as possible.
2. At the conclusion of the in-service awareness program, educational goals and operational objectives should be established to clearly define the mission of the computer related activities in support of the overall educational program.
3. Plan curricular modifications to accomodate any new course offerings as well as alterations to existing course offerings to capitalize upon appropriate computer related activities consistent with the districts' goals for computer supported education.
4. Selection of:
   (a) Courseware to support the curriculum modifications
   (b) Hardware which is compatible with the selected courseware.

5. Plan for student access to computer facilities. Decisions must be made at this time with respect to physical location of the computer hardware as well as the physical configuration of the computer laboratory. Several major considerations follow:

   (a) Physical security for computers and support hardware.

   (b) Convenience of location for maximum student access.

   (c) Availability of supervisory personnel for maximum student access.

   (d) Convenience of location for maximum faculty access.

   Possible locations for consideration would be:

   (1) The Media Center; Media Centers are open and staffed throughout the school day. Media Center personnel would often times however not be the most competent computer specialists.

   (2) Self contained computer laboratory; availability of supervisory personnel often times restricts student access.

   (3) Classroom assignment; classroom assignment provides maximum flexibility but restricts accessibility.

6. Plan and execute in-service training programs to provide specific skills for those teachers who will have responsibility for teaching computer skills under the modified curriculum.

7. Coordination with the counseling staff to insure adequate and accurate dissemination of information to students regarding new program offerings.

8. Coordination with the counseling staff to insure adequate and accurate dissemination of information to parents regarding new course offerings.

9. Planning and preparation for adequate testing procedures to determine effectiveness. (Determine the extent to which the educational goals are achieved.)

10. Establish a continuing committee to evaluate the computer program on the basis of need for new programs and needed modifications to the existing programs to insure that they support the stated educational goals for computer supported education.

As a direct response to the concerns articulated by the district administrators who responded to the Needs for Computer Assisted Instruction surveys, a National Science Foundation grant proposal was prepared which would provide computer resource specialists for the educational community within Maricopa County (Phoenix metropolitan area). This proposed training program was to provide training to enable the participants to effectively support their respective districts as they addressed the task of implementing computer supported educational delivery systems. The project was funded for the summer of 1981 and for the 1981-82 academic year. The details of the funded proposal are as follows:

We recognize that the ultimate success of any program to implement computer supported education requires the unqualified support of the district administration and governing board. Each district was therefore required to submit a letter which pledged support for the In-Service training program in their district. Each participating district additionally agreed to grant one hour of professional growth credit on their respective salary schedules to each teacher who fully participated in the In-Service programs.

The project was executed in three phases:

Since active administrative participation in the program was deemed to be an essential aspect of the project, Phase I consisted of a one day general orientation program for administrators, intended to heighten their level of computer awareness as well as to contribute to their general enthusiasm for computer supported education. Phase I was conducted on the first day of the four week Summer Institute as described in Phase II.

Phase II consisted of a four week Summer Institute at Arizona State University to provide computer training to thirty teachers representing thirteen districts. The participants had a minimum of two years experience in their subject area or grade level. Previous computer experience ranged from none to quite extensive.

The educational goal of this phase of the project was to provide well trained computer resource people within the educational community in Maricopa County. These computer resource people would have skills in:

1. Conducting professional growth workshops in computer literacy.
2. Developing effective software selection criteria.
3. Making hardware selection decisions which are appropriate to implement the computer supported instructional program as developed by each district.
4. Develop and coordinate in-district authoring teams from among interested faculty members.
5. Assist in the development of computer related curriculum.
6. Teach computer related courses.

The academic preparation of the participants, to insure that they were adequately trained to carry out the stated goals, was provided by structured morning lecture activities combined with hand-on computer activities each afternoon. Each participant cooperated in a group authoring project which was presented to the entire group at the conclusion of the Summer Institute. Upon completion of their summer training, these teachers returned to their respective districts to function as computer resource specialists for the educational community within Maricopa County. The skills gained by the participants as a result of this participation enabled them to guide their colleagues in innovative applications of microcomputers to significantly improve the quality of the educational delivery system in their respective districts.

The following topics were presented in the Summer Institute in order to insure that the participants would possess the necessary skills to carry out the above stated objectives:

1. Computer systems and logic - extensive hands-on experience.
2. Introduction to programming techniques.
3. Introduction to computer languages;
    a. machine language
    b. assembly language
    c. BASIC
    d. Pascal
    e. PILOT
    f. LOGO
4. Authoring techniques.
5. Software selection criteria.
6. Review of software.
7. Hardware selection criteria.
8. Preparation plans for the introduction of computer supported instruction into your district.
9. Computer literacy topics[2]
    a. history of computers
    b. computers and society
    c. computer related careers
    d. what the future holds
10. Preparation of a course of study for professional growth workshops.

Phase III of the program was the In-Service aspect in which each participant cooperated in the presentation of an eighteen contact hour computer literacy program to interested teachers from their respective districts. Each presenting team planned their own In-Service program, therefore the program

material and structure varied considerably between groups. There were ten teaching teams which ranged from one to eight members who made twelve presentations on ten campuses. This In-Service program reached a total of 272 participants. An example of an In-Service program presented by the Glendale Union, Peoria Unified and Pendergast Elementary group follows. This group met three hours, one afternoon each week for six weeks.

Requirements:

1. Maintain a notebook or log.
2. Submit at least one summary of an article on instructional use of computers.
3. Presentation of a brief authoring project.

Day 1 - Course Introduction
History of Computers
Types of Computers and Major Components of Computers.

Day 2 - Computers Role in Education
Introduction to Microcomputers
Flowcharting

Day 3 - Courseware Evaluation Criteria
Introduction to BASIC

Day 4 - Courseware Demonstration
Hardware Selection Criteria
BASIC

Day 5 - Courseware Demonstration
Group Work on Authoring Project

Day 6 - Computer Effects on Society/Careers
Courseware Project Presentations
"Where Do We Go From Here?"
Final Evaluation

Evaluation of this project has been an on-going process. Throughout the four week Summer Institute, evaluation forms were administered and evaluated daily. The In-Service Institutes have been evaluated by means of an attitudinal survey which was administered on the first day and an evaluation questionnaire which was administered on the last day of each eighteen hour In-Service program. The program was periodically modified as appropriate and practical in response to participant reaction.

An evaluation of the attitudinal survey indicated that the participants were nearly evenly divided by sex: 55% female. The participants were experienced teachers, having an average age of 37 years, with 12 years of teaching experience. Following are some observations from the attitudinal survey:

1. 89% indicated that they would have participated in the In-Service program even if salary credit had not been offered.
2. 87% would have welcomed the opportunity to introduce microcomputers into their instructional programs.
3. 64% felt that the implementation of microcomputers would significantly improve the efficiency of the classroom teacher and enhance the sense of job satisfaction.
4. 69% considered the microcomputer to be a permanent part of the educational delivery system.
5. 70% felt that the implementation of microcomputers into instructional applications would not dehumanize the learning process.
6. 72% felt that the introduction of microcomputers into education has provided a rare opportunity to creatively participate in the development of dynamic new educational techniques.
7. 69% felt that microcomputer technology can more effectively provide each student in public education with an individualized instructional program than is presently possible.

8. In-Service participants had a very favorable attitude toward instruction by peers.

The teachers who participated in this program had very high expectations of computers and have very positive attitudes toward computers. It was noted both from interview and from the evaluation of the final questionnaires that the In-Service participants experienced high levels of frustration, resulting from their efforts in BASIC programming.

RECOMMENDATIONS

On the basis of the results of this project, the following are recommendations to be considered in teacher training projects:

1. In-Service participants should spend very little time on authoring or programming techniques. Most of the training should be directed toward user skills, i.e. operating the computer, loading programs from tape and disk, saving programs to tape and disk, operating printers, initializing disks and using educational software.
2. In view of the excellent authoring programs now available, instruction in BASIC programming should be minimized and instruction in the use of a good authoring program should be emphasized (PILOT for example). In view of the time constraints imposed, we feel that except for a brief introduction to BASIC, instruction in programming per se should be deferred to specific classes for that purpose.
3. Participants should leave the Summer Institute with a structured course of study for the participants in the In-Service programs. The schedule should be outlined for each hour. The In-Service programs should include an examination of courseware programs similar to one each of them must encounter if teaching a course which used Computer Assisted Instruction.
4. More time should be devoted to demonstrating computer class management programs. i.e. Genis I, S.R.A., ZES, gradebook programs and card reader systems.

CONCLUSIONS

In conclusion: This project effectively fulfilled its goal of providing training options and support functions to meet the needs of the school districts for the implementation of educational microcomputer technology.

The elementary and high school districts in Central Arizona have, as a result of this project, access to over 300 teachers who are now adequately prepared to provide training support for the implementation of educational microcomputer technology. Two hundred and seventy-two teachers have received eighteen contact hours of in-service training in computer literacy and are thus prepared to function as facilitators in future in-service training programs. An additional thirty teachers who participated in the summer program have planned and successfully conducted at least one eighteen contact hour in-service training seminar. These thirty educational computer specialists are adequately trained to function as In-service training coordinators and computer curriculum advisors.

The overall program was enthusiastically received and all feedback indicated that participants and district administrators considered the program to have effectively met the needs for computer literacy training of teachers in Maricopa County.

REFERENCES

1. Survey of Arizona Public School Practices and Needs for Computer Assisted Instruction - May, 1980, G. Bitter, Chair, College of Education, Arizona State University
2. Bitter, Gary G. Computers In Today's World unpublished manuscript (to be published by John Wiley and Sons - January, 1983)